

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Christophe Pierrat et al.

Application No.: Filed Herewith

Parent Appln. Group No.: 2825

Filed: 10/16/2003

Parent Appln. Examiner: Paul Dinh

For: "Displacing Edge Segments On A Fabrication Layout Based On Proximity Effects Model Amplitudes For Correcting Proximity Effects"

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Date: October 16, 2003

INFORMATION DISCLOSURE STATEMENT

List of Sections Forming Part of This Information Disclosure Statement

The following sections are being submitted for this Information Disclosure Statement:

1. Identification of Prior Application in Which Listed Information Was Already Cited and for Which No Copies Are Submitted or Need Be Submitted

Section 1. Identification of Prior Application in Which Listed Information Was Already Cited and for Which No Copies Are Submitted or Need Be Submitted

This application relies, under 35 U.S.C. § 120, on the earlier filing date of prior application Serial No.: 09/728,885, filed on December 1, 2000, now allowed (U.S. Patent Number not yet known).

Copies of the documents listed on the accompanying Form PTO-1449 (22 pages) that are not enclosed were previously submitted in Application No. 09/728,885, from which this Application claims an earlier effective filing date.

Applicants respectfully request that the listed information be considered by the Examiner and be made of record in the above-identified application. If form PTO-1449 is enclosed, the Examiner is requested to initial and return it in accordance with MPEP § 609.

This statement is not intended to represent that a search has been made or that the information cited in the statement is, or is considered to be, material to patentability as defined in 37 C.F.R. § 1.56.

☒ This statement qualifies under 37 C.F.R. § 1.97, subsection (b) because (check all that apply):

- ☒ (1) It is being filed within 3 months of the application filing date and is other than a continued prosecution application under § 1.53(d)
-- OR --
- ☐ (2) It is being filed within 3 months of entry of a national stage
-- OR --
- ☐ (3) It is being filed before the mail date of the first Office Action on the merits.
-- OR --
- ☐ (4) It is being filed before the mailing of a first Office Action after the filing of a request for continued examination under § 1.114

SN: Filed Herewith

- ☐ 37 C.F.R. § 1.97(c). If this statement is being filed after the period specified in § 1.97(b), but before the mailing date of the earlier of a final office action under § 1.113, a notice of allowance under § 1.311, or an action that otherwise closes prosecution in the application, then:
- ☐ a certification as specified in § 1.97(e) is provided below; or
- ☐ a fee of \$180.00 as set forth in § 1.17(p) is authorized below, enclosed, or included with the payment of other papers filed together with this statement.
- ☐ 37 C.F.R. § 1.97(d). If this statement is being filed after the period specified in § 1.97(c), but on or before payment of the issue fee, then:
- A. a certification as specified in § 1.97(e) is completed below; and
- B. a fee of \$180.00 as set forth in § 1.17(p) is authorized below, enclosed, or included with the payment of other papers filed together with this statement.
- ☒ *Fee Authorization.* Applicant believes NO fee is due. However, in the event a fee is found to be due, the Commissioner is hereby authorized to charge Deposit Account No. 50-0574 (Docket No. NTI-019-5-1D).

Date: 10-16-03

Tel. No.: 1-408-451-5907
Customer No.: 29477


Signature of Practitioner

Jeanette S. Harms, Reg. No. 35,537
Bever, Hoffman & Harms, LLP

I hereby certify that this correspondence is being deposited with the United States Postal Service as EXPRESS MAIL, Label No: EV 338 032 709 US addressed to: Mail Stop Patent Application, Commissioner for Patents, P.O. Box 1450, Alexandria, VA, 22313-1450.

10/16/03
Date


Signature: Rebecca A. Baumann

INFORMATION DISCLOSURE CITATION PTO-1449		ATTY. DOCKET NO. NTI-019-5-1D		SERIAL NO. Filed Herewith		
		APPLICANT Pierrat, et al.				
		FILING DATE Filed Herewith		GROUP		
U.S. PATENT DOCUMENTS						
EXAMINER'S INITIALS	PATENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE
	4,231,811	11/4/80	Somekh, et al.	148	1.5	9/13/79
	4,456,371	6/26/84	Lin	355	71	6/30/82
	4,902,899	2/20/90	Lin, et al.	250	492.1	6/1/87
	5,498,579	3/12/96	Borodovsky, et al.	437	250	6/8/94
	5,553,274	9/3/96	Liebmann	395	500	6/6/95
	5,636,002	6/3/97	Garofalo	355	53	10/31/95
	5,663,017	9/2/97	Schinella, et al.	430	5	6/7/95
	5,723,233	3/3/98	Garza, et al.	430	5	2/27/96
	5,766,806	6/16/98	Spence	430	5	9/9/96
	5,821,014	10/13/98	Chen, et al.	430	5	2/28/97
	5,862,058	1/19/99	Samuels, et al.	364	491	5/16/96
	5,879,844	3/9/99	Yamamoto, et al.	430	30	12/20/96
	5,885,734	3/23/99	Pierrat, et al.	430	5	8/15/96
	5,900,338	5/4/99	Garza, et al.	430	5	8/15/97
	5,994,002	11/30/99	Matsuoka	430	5	9/4/97
	6,004,702	12/21/99	Lin	430	5	5/21/98
	6,077,310	6/20/00	Yamamoto, et al.	716	19	1/29/99
	6,078,738	6/20/00	Garza, et al.	395	500.22	5/8/97
EXAMINER			DATE CONSIDERED			

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP § 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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	4,426,584	1/17/1984	Bohlen, et al.	250	492.2	6/3/1981
	4,895,780	1/23/1990	Nissan-Cohen, et al.	430	5	10/25/1988
	5,208,124	5/4/1993	Sporon-Fiedler, et al.	430	5	3/19/1991
	5,682,323	10/28/1997	Pasch, et al.	364	491	3/6/1995
	5,958,635	9/28/1999	Reich, et al.	430	30	10/20/1997
	5,972,541	10/26/1999	Sugasawara, et al.	430	5	3/4/1998
	6,007,310	12/28/1999	Jacobsen, et al.	417	362	5/23/1997
	6,114,071	9/5/2000	Chen, et al.	430	5	4/6/1998
	6,289,499	9/11/2001	Rieger, et al.	716	21	1/7/2000
	6,249,597 B1	6/19/2001	Tsudaka	382	144	12/17/1998

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	6,014,456	1/11/2000	Tsudaka	382	144	7/15/1996
	6,154,563	11/28/2000	Tsudaka	382	144	12/17/1998
	6,298,473 B1	10/2/2001	Ono, et al.	716	21	12/3/1998
	6,453,457 B1	9/17/2002	Pierrat, et al.	716	19	9/29/2000
	2002/0100004 A1	7/25/2002	Pierrat, et al.	716	5	3/15/2002

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	5,991,006	11/23/0199	Tsudaka	355	53	10/27/1997
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5,663,893	09-1997	Wampler et al.	716	19
6,416,907	07-2002	Winder et al.	430	5
6,453,457	09-2002	Pierrat et al.	716	19
6,523,162	02-2003	Agrawal et al.	716	19

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	3-80525	4/5/1991	JP			<input type="checkbox"/>	<input type="checkbox"/>
	2,324,169 A	10/14/1998	GB			<input type="checkbox"/>	<input type="checkbox"/>
	WO 99/47981	9/23/1999	WO			<input type="checkbox"/>	<input type="checkbox"/>

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OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)			
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00082	Barouch, E., et al., "OPTIMASK: An OPC Algorithm for Chrome and Phase-Shift Mask Design", SPIE, Vo. 2440, pp. 192-206, February 1995.		
00084	Brunner, T., et al., "Approximate Models for Resist Processing Effects", SPIE, Vol. 2726, pp. 198-207, March 1996.		
00085	Brunner, T., "Rim Phase-Shift Mask Combined with Off-Axis Illumination: A Path to 0.5(lampda) / Numerical Aperture Geometries", Optical Engineering, Vol. 32, No. 10, pp. 2337-2343, October 1993.		
00086	Casey, Jr., J.D., et al., "Chemically Enhanced FIB Repair of Opaque Defects on Molybdenum Silicide Photomasks", SPIE, Vol. 3236, pp. 487-497 (1997).		
00087	Chang, K., et al., "Accurate Modeling of Deep Submicron Interconnect Technology", TMA Times, Vol. IX, No. 3 (1997).		
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00101	Henke, W., et al., "A Study of Reticule Defects Imaged Into Three-Dimensional Developed Profiles of Positive Photoresist Using the Solid Lithography Simulator", Microelectronics Eng., Vol. 14, pp. 283-297 (1991).		
00102	Ibsen, K., et al., "Clear Field Reticule Defect Disposition for Advanced Sub-Half Micron Lithography", SPIE, Proceedings Of The 17th Annual Symposium On Photomask Technology And Management, Vol. 3236, pp. 124-135 (1997).		
00105	Ishiwata, N., et al., "Novel Alternating Phase Shift Mask with Improved Phase Accuracy", SPIE, Proceedings Of The 17th Annual Symposium On Photomask Technology And Management, Vol. 3236, pp. 243-249 (1997).		
00106	Jinbo, H., et al., "0.2um or Less i-Line Lithography by Phase-Shifting-Mask Technology", IEEE, pp. 33.3.1-33.3.4 (1990).		
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00108	Jinbo, H., et al., "Improvement of Phase-Shifter Edge Line Mask Method", Japanese Journal Of Applied Physics, Vol. 30, No. 11B, pp. 2998-3003, November 1991.		
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OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)			
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00118	Microunity, "OPC Technology & Product Description", MicroUnity Systems Engineering, Inc., pp. 1-5.		
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00122	Nistler, J., et al., "Phase Shift Mask Defect Printability Analysis", Proceedings Of The Microlithography Seminar INTERFACE '93, OCG Microelectronic Materials, Inc., pp. 11-28 (1993).		
00123	Ohtsuka, H., et al., "Phase Defect Repair Method for Alternating Phase Shift Masks Conjugate Twin-Shifter Method", Jpn. J. Appl. Phys., Vol. 31, pp. 4143-4149 (1992).		
00124	Park, C., et al., "An Automatic Gate CD Control for a Full Chip Scale SRAM Device", SPIE, Vol. 3236, pp. 350-357 (1997).		
00125	Pati, Y.C., et al., "Exploiting Structure in Fast Aerial Image Computation for Integrated Circuit Patterns", IEEE Transactions On Semiconductor Manufacturing, Vol. 10, No. 1, pp. 62-74, February 1997.		
00126	Pati, Y.C., et al., "Phase-Shifting Masks for Microlithography: Automated Design and Mask Requirements", J. Opt. Soc. Am., Vol. 11, No. 9, pp. 2438-2452, September 1994.		
00128	Precim, "Proxima System", Precim Company, Portland, Oregon (2 pages).		
00129	Precim, "Proxima Wafer Proximity Correction System", Precim Company, Portland, Oregon (2 pages).		
00130	Rieger, M., et al., "Customizing Proximity Correction for Process-Specific Objectives", SPIE, Vol. 2726, pp. 651-659 (1996).		
00131	Rieger, M., et al., "Mask Fabrication Rules for Proximity-Corrected Patterns", Precim Company, Portland, Oregon (10 pages).		

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OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)			
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00132	Rieger, M., et al., "System for Lithography Proximity Compensation", Precim Company, Portland, Oregon, September 1993 (28 pages).		
00133	Rieger, M., et al., "Using Behavior Modeling for Proximity Correction", Precim Company, Portland, Oregon (6 pages).		
00134	Roman, B., et al., "Implications of Device Processing on Photomask CD Requirements", SPIE, Vol. 3236 (1997) (Abstract Only).		
00136	Spence, C., et al., "Automated Determination of CAD Layout Failures Through Focus: Experiment and Simulation", SPIE, Vol. 2197, pp. 302-313 (1994).		
00137	Spence, C., et al., "Detection of 60(degree) Phase Defects on Alternating PSMs", Advanced Micro Devices, KLA-Tencor, DuPont RTC (2 pages).		
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00144	Sugawara, M., et al., "Defect Printability Study of Attenuated Phase-Shifting Masks for Specifying Inspection Sensitivity", Sony Corporation, Kanagawa, Japan (16 pages).		
00146	Trans Vector, "Now Better Quality Photomasks", Trans Vector Technologies, Inc., Camarillo, California (4 pages).		
00147	Vacca, A., et al., "100nm Defect Detection Using a Dynamically Programmable Image Processing Algorithm", SPIE, Vol. 3236 (1997) (Abstract Only).		
00148	Vacca, A., et al., "100nm Defect Detection Using an Existing Image Acquisition System", SPIE, Vol. 3236, pp. 208-21 (1998).		
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00150	Wiley, J., et al., "Device Yield and Reliability by Specification of Mask Defects", Solid State Technology, Vol. 36, No. 7, pp. 65-66, 70, 72, 74, 77, July 1993.		
00151	Wiley, J., et al., "The Effect of Off-Axis Illumination on the Printability of Opaque and Transparent Reticle Defects", SPIE, Vol. 2512, pp. 432-440 (1995).		
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	Ackmann, P. et al., "Phase Shifting And Optical Proximity Corrections To Improve CD Control On Logic Devices In Manufacturing For Sub 0.35 μ m I-Line", Advance Micro Devices (8 pages).	
	Asai, N. et al., "Proposal For The Coma Aberration Dependent Overlay Error Compensation Technology", <i>Jpn. J. Appl. Phys.</i> , Vol. 37, pp. 6718-6722 (1998).	
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	Harafuji, K. et al., "A Novel Hierarchical Approach For Proximity Effect Correction In Electron Beam Lithography", <i>IEEE</i> , Vol. 12, No. 10, pp. 1508-1514, October 1993.	
	Lin, B.J., "Methods To Print Optical Images At Low-k ₁ Factors", <i>SPIE</i> , Optical/Laser Microlithography III, Vol. 1264, pp. 2-13 (1990).	
	Pierrat, C. et al., "A Rule-Based Approach To E-Beam And Process-Induced Proximity Effect Correction For Phase-Shifting Mask Fabrication", <i>SPIE</i> , Vol. 2194, pp. 298-309 (1994).	
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	Saleh, B. et al., "Reduction Of Errors Of Microphotographic Reproductions By Optimal Corrections Of Original Masks", <i>Optical Engineering</i> , Vol. 20, No. 5, pp. 781-784, September/October 1981.	
	Spence, C. et al., "Integration Of Optical Proximity Correction Strategies In Strong Phase Shifters Design For Poly-Gate Layers", <i>Bacus News</i> , Vol. 15, Issue 12, pp. 1, 4-13, December 1999.	
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	OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)	
EXAMINER'S INITIALS	CITATION	
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INFORMATION DISCLOSURE CITATION PTO-1449		Atty. Docket No. NTI-019-5-1D Applicant PIERRAT, Christophe Filing Date Filed Herewith Serial No. Filed Herewith Group
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		PIERRAT, Christophe	
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